REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change screening and group A inspections. Update table I. Update vendor's part number.	87-06-22	M. A. Frye
B	Make changes to table I, 1.2.2, 1.3, 4.2a, and 4.3.2b. Editorial changes throughout. Make change to table II.	88-06-23	M. A. Frye
C	Add vendor CAGE number 01295 to the drawing as a supplier for device 02. Add burn-in test condition A to 4.2 and 4.3.2. Changes to table I and figure 4, pages 11 and 12. Editorial changes throughout.	89-12-13	M. A. Frye
D	Change to vendor similar Part or Identifying Number (PIN) for vendor CAGE 01295. Editorial changes throughout.	92-03-04	M. A. Frye

CURRENT CAGE CODE 67268

REV																				
SHEET																				
REV	D																			
SHEET	15																			

REV STATUS OF SHEETS	REV	D	D	D	C	C	D	D	C	C	C	C	C	C	D	
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
James E. Jamison

CHECKED BY
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APPROVED BY
Michael A. Frye

DRAWING APPROVAL DATE
86-08-08

REVISION LEVEL D

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, DIGITAL, BIPOLAR, MEMORY, 16 X 48 X 8 FIELD PROGRAMMABLE, LOGIC SEQUENCER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**14933**	**5962-86709**

SHEET 1 OF 15

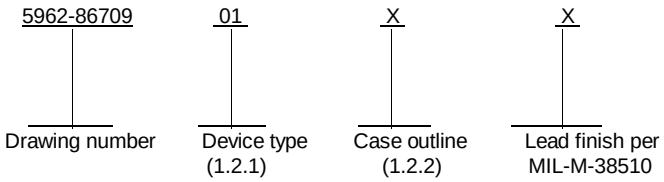
DESC FORM 193
JUL 91

5962-E263

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:



1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	82S105	16 x 48 x 8, field programmable, logic sequencer, (FPLS)
02	82S105	16 x 48 x 8, field programmable, logic sequencer, (FPLS)

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
X	D-10 (28-lead, 1.490" x 0.610" x 0.232"), dual-in-line package
Y	F-11 (28-lead, 0.740" x 0.380" x 0.090"), flat package
3	C-4 (28-terminal, 0.460" x 0.460" x 0.100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage	7.0 V dc maximum
Input voltage	10.0 V dc maximum during programming and 5.5 V dc maximum during operation.
Storage temperature range	-65°C to +150°C
Maximum power dissipation 1/	1.018 W
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (Θ_{JC}):	
Cases X, Y, and 3	See MIL-M-38510, appendix C
Junction temperature (T_J)	+150°C
Output sink current 2/	100 mA

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	4.5 V dc to 5.5 V dc
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Case operating temperature range (T_C)	-55°C to +125°C

1/ Must withstand the added P_D due to short-circuit test; e.g., I_{OS}.
2/ Not applicable for device type 02.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL -BUL -103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein. Ni-Chrome or Titanium - Tungsten shall be used as the fusible link or programming element.

3.2.1 Design documentation. The design documentation shall be in accordance with MIL-M-38510 and, unless otherwise specified in the contract or purchase order, shall be retained by the manufacturer but be available for review by the acquiring activity or contractor upon request.

3.2.2 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.2.3 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.4 Truth table.

3.2.4.1 Unprogrammed devices. The truth table for unprogrammed devices for contracts involving no altered item drawing shall be as specified on figure 2. When required in groups A, B, or C (see 4.3.1c), the devices shall be programmed by the manufacturer prior to test in a checkerboard pattern (a minimum of 50 percent of the total number of gates programmed) or to any altered item drawing pattern which includes at least 25 percent of the total number of gates programmed.

3.2.4.2 Programmed devices. The truth table for programmed devices shall be as specified by an attached altered item drawing.

3.2.5 Logic diagram. The logic diagram shall be as specified on figure 3.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ $V_{CC} = 5.0\ V \pm 10\%$ unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Low level input voltage	V_{IL}	$V_{CC} = 4.5\ V$	1, 2, 3	All		0.8	V
High level input voltage	V_{IH}	$V_{CC} = 5.5\ V$	1, 2, 3	All	2		V
Input clamp voltage 2/	V_{IC}	$V_{CC} = 4.5\ V$, $I_I = -18\ mA$	1, 2, 3	All		-1.2	V
Low level input current	I_{IL}	$V_{CC} = 5.5\ V$, $V_I = 0.45\ V$	1, 2, 3	01		-150	µA
		$V_I = 0.4\ V$		02		-250	
High level input current	I_{IH}	$V_{CC} = 5.5\ V$, $V_I = 5.5\ V$	1, 2, 3	All		50	µA
Clock input current	I_I	$V_{CC} = 5.5\ V$, $V_I = 0.45\ V$	1, 2, 3	01		-350	µA
Low level output voltage 3/	V_{OL}	$V_{CC} = 4.5\ V$, $V_{IL} = 0.8\ V$ $V_{IH} = 2\ V$, $I_{OL} = 9.6\ mA$	1, 2, 3	All		0.5	V
High level output voltage 4/	V_{OH}	$V_{CC} = 4.5\ V$, $V_{IL} = 0.8\ V$ $V_{IH} = 2\ V$, $I_{OH} = -2\ mA$	1, 2, 3	All	2.4		V
Output short-circuit current 2/ 5/	I_{OS}	$V_{CC} = 5\ V$, $V_O = 0\ V$	1, 2, 3	01	-15	-85	mA
		$V_{CC} = 5.5\ V$, $V_O = 2.25\ V$		02	-30	-112	
DC supply current 6/	I_{CC}	$V_{CC} = 5.5\ V$	1, 2, 3	All		185	mA
Three-state output current 7/	I_{OZ}	$V_{CC} = 5.5\ V$, $V_{OUT} = 5.5\ V$	1, 2, 3	01		60	µA
		$V_{CC} = 5.5\ V$, $V_{OUT} = 2.7\ V$		02		20	
		$V_{CC} = 5.5\ V$, $V_{OUT} = 0.45\ V$		01		-60	
		$V_{CC} = 5.5\ V$, $V_{OUT} = 0.4\ V$		02		-20	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ $V_{CC} = 5.0\ V \pm 10\%$ unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Functional tests		See 4.3.1d	7, 8				
Propagation delay time, CLK to output	t_{CKO}	$V_{CC} = 5.0\ V$ $R1 = 470\Omega$, $R2 = 1\ k\Omega$ $C_L = 30\ pF$ See figure 4	9, 10, 11	01		35	ns
				02		20	
Propagation delay time, OE- to output- 8/	t_{OE}		9, 10, 11	01		40	
			9	02		25	
Propagation delay time, OE+ to output+ 8/	t_{OD}		9	01		40	
				02		15	
Propagation delay time, power-on preset	t_{PPR}		9, 10, 11	All		20	
Propagation delay time, preset	t_{PR}			01		45	
				02		25	
Pulse width, CLK high and CLK low 9/	t_{CKH} t_{CKL}			01	40		
				02	12		
Pulse width, CLK period	t_{CKP}			01	95		
				02	24		
Pulse width, CLK period 9/ (through complement array)	t_{CKP}			All	135		
Pulse width, preset	t_{PRH}			All	40		

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ $V_{CC} = 5.0\ V \pm 10\%$ unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Setup time, input to CLK	t_{IS}	$V_{CC} = 5.0\ V$ $R_1 = 470\Omega$, $R_2 = 1\ k\Omega$ $C_L = 30\ pF$, See figure 4	9,10,11	01	60		ns
				02	18		
Setup time, input to CLK 8/ (through complement array)	t_{IS}			01	100		
				02	40		
Setup time, power-on preset	t_{VS}			All	5		
Setup time, preset 8/	t_{PRS}			All	5		
Hold time, CLK to input	t_{IH}			All	10		

1/ All voltage values are with respect to ground.
2/ Test one pin at a time.
3/ Measured with a programmed logic condition for which the output is at a low logic level and V_{IL} applied to PR/$\overline{OE}$. Output sink current is supplied through a resistor to V_{CC}.
4/ Measured with V_{IL} applied to $\overline{OE}$ and a logic high stored or with V_{IH} applied to PR.
5/ Duration of short-circuit should not exceed 1 second.
6/ I_{CC} is measured with the PR/$\overline{OE}$ input grounded and the outputs open.
7/ Measured with V_{IH} applied to PR/$\overline{OE}$.
8/ Not testable on unprogrammed devices.
9/ To prevent spurious clocking, clock rise time (10% to 90%) $\le$ 30 ns.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full case operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

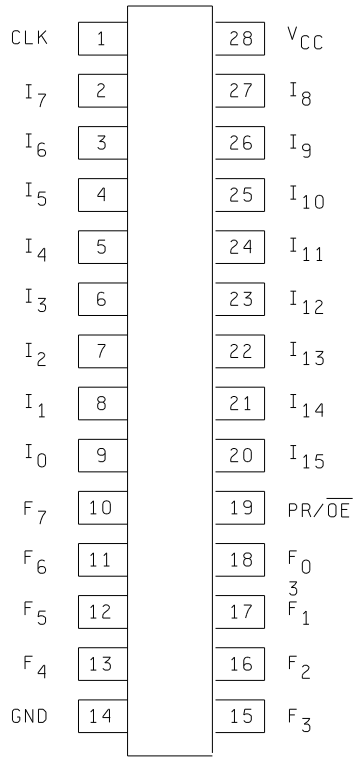
3.10 Processing options. Since the device is capable of being programmed by either the manufacturer or the user to result in a wide variety of configurations; two processing options are provided for selection in the contract, using an altered item drawing.

3.10.1 Unprogrammed device delivered to the user. All testing shall be verified through group A testing as defined in 3.2.4.1 and table II. It is recommended that users perform subgroups 7 and 9 after programming to verify the specific program configuration.

3.10.2 Manufacturer-programmed device delivered to the user. All testing requirements and quality assurance provisions herein, including the requirements of the altered item drawing, shall be satisfied by the manufacturer prior to delivery.

DEVICE TYPES 01 AND 02

CASES X AND Y



CASE 3

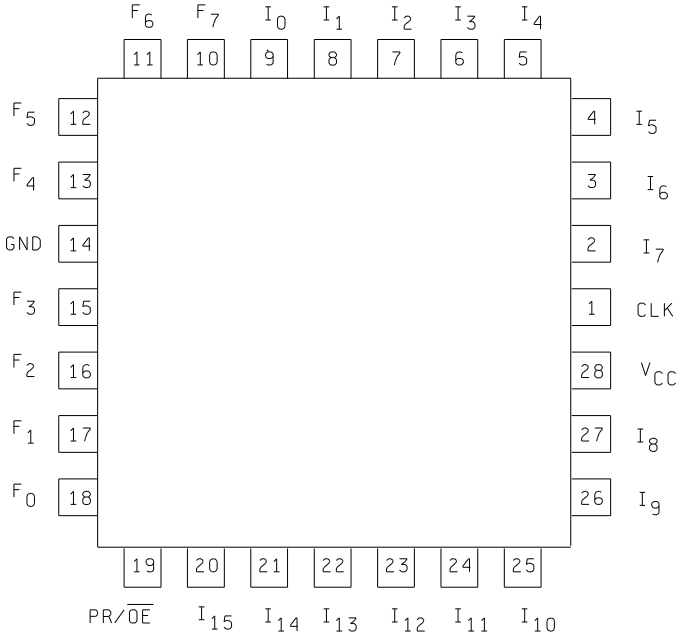


FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE **A**		**5962-86709**
		REVISION LEVEL D	SHEET **8**

V_{CC}	Option PR	Option $\overline{OE}$	I_0 CLK S R	$Q_{P/F}$	F
	H		* X X X	H	H
	L		+10 V X X X	Q_n	$(Q_{p)n}$
	L		X X X X	Q_n	$(Q_{F)n}$
		H	* X X X	Q_n	Hi-Z
+5 V		L	+10 V X X X	Q_n	$(Q_{P)n}$
		L	X X X X	Q_n	$(Q_{F)n}$
		L	X ↑ L L	Q_n	$(Q_{F)n}$
		L	X ↑ L H	L	L
		L	X ↑ H L	H	H
		L	X ↑ H H	IND	IND
↑		X	X X X X	H	

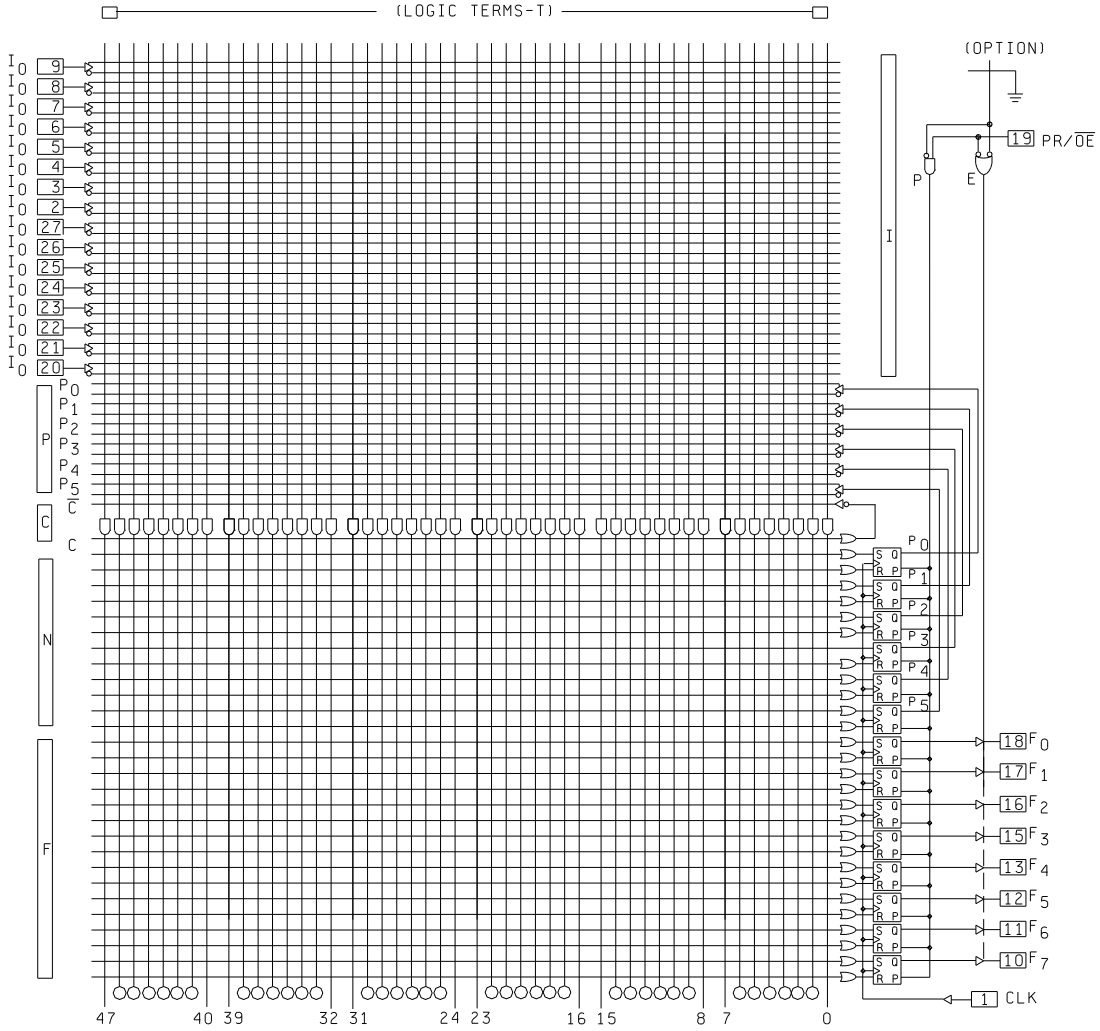
NOTES:

1. Positive logic

   $S/R = T_0 + T_1 + T_2 + \ldots + T_{47}$
   $T_n = (I_0, I_1, I_2)\ (P_0, P_1 \ldots P_5)$

2. Either preset (active-high) or $\overline{\text{output enable}}$ (active-low) are available, but not both. The desired function is a user programmable option.
3. ↑ denotes transition from low to high level.
4. R = S = High is an illegal input condition
5. * = H/L/+ 10 V
6. X = Don't care (s) $\leq$ 5.5 V.

FIGURE 2. Truth table.



NOTES:
1. All AND gate inputs with a blown link float to a logic "1".
2. All OR gate inputs with a blown link float to a logic "0".

FIGURE 3. Logic diagram.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE **A**		**5962-86709**
		REVISION LEVEL D	SHEET **10**

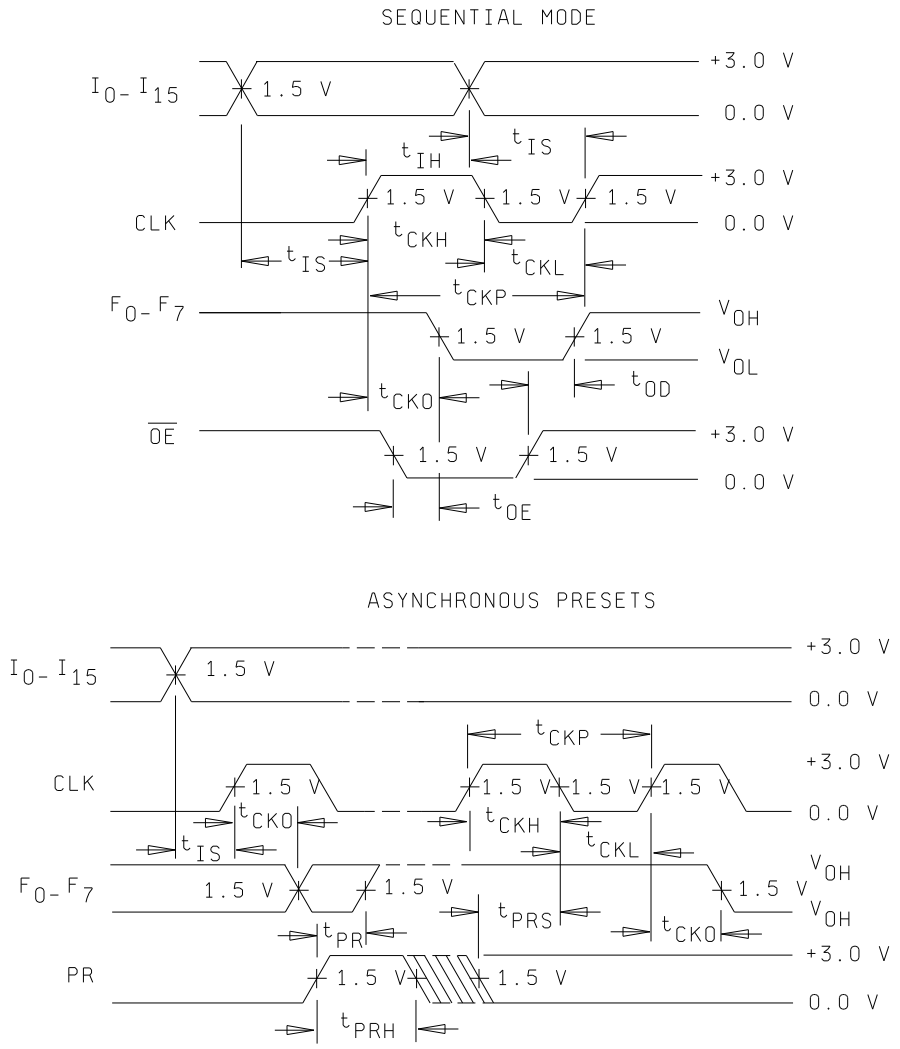
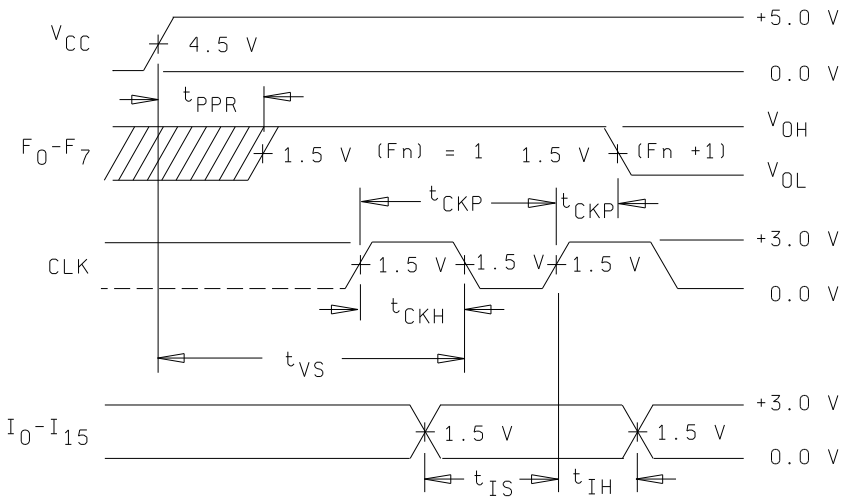


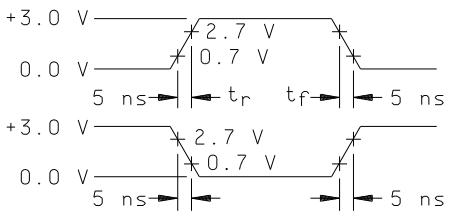
FIGURE 4. Waveforms and test circuit.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-86709
		REVISION LEVEL D	SHEET 11

POWER-ON PRESET



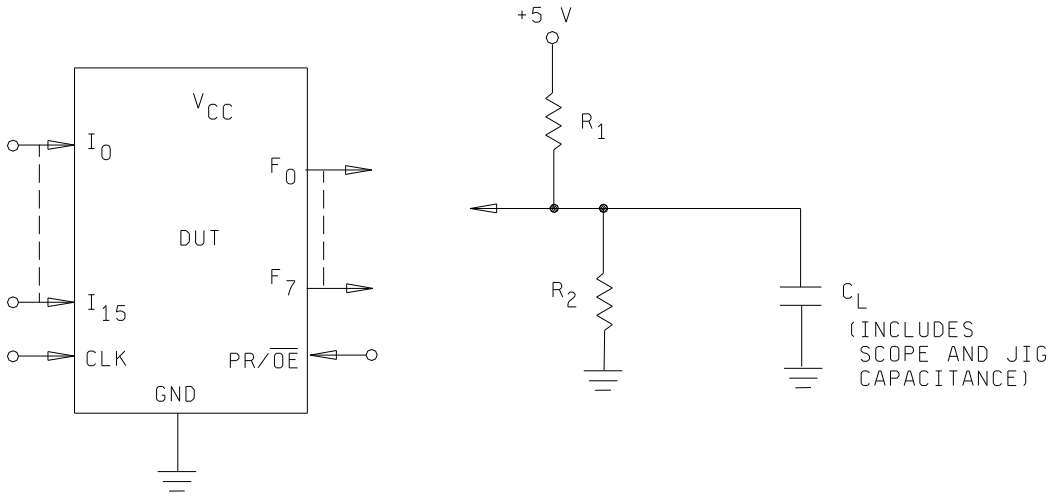
VOLTAGE WAVEFORM



MEASUREMENTS: ALL CIRCUIT DELAYS ARE MEASURED AT THE +1.5 V LEVEL OF INPUTS AND OUTPUTS, UNLESS OTHERWISE SPECIFIED

FIGURE 4. Waveforms and test circuit - Continued.

TEST LOAD CIRCUIT



NOTE: Voltage values shown in timing diagrams are for device 01 only.
For device 02 those values are:

a. V_{ref} = 1.3 V except for t_{PPR} (voltage waveform) which remains at 1.5 V.
b. Input voltage waveform (voltage waveform) is 0.3 V to 3.5 V.
c. t_r and t_f (voltage waveform) is 10% to 90% of the applied waveform.
d. Test load circuit (voltage waveform): +5 V changes to +7 V.

FIGURE 4. Waveforms and test curcuit - Continued.

TABLE II. Electrical test requirements. 1/ 2/ 3/

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004) for programmed devices	1*, 2, 3, 7*, 8, 9
Final electrical test parameters (method 5004) for unprogrammed devices	1*, 2, 3, 7*, 8
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3, 7, 8

1/ * PDA applies to subgroups 1 and 7.
2/ Any or all subgroups may be combined with using high speed testers.
3/ Subgroups 7 and 8 functional tests shall also verify that no fuses are blown for unprogrammed devices or that the altered item drawing pattern exists for programmed devices.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125° C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

c. All devices process to an altered item drawing may be programmed either before or after burn-in at the manufacturer's discretion. The required electrical testing shall include, as a minimum, the final electrical tests for programmed devices as specified in table II herein.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Unprogrammed devices shall be tested for programmability and ac performance compliance to the requirements of group A, subgroups 9, 10, and 11. Either of two techniques is acceptable:

(1) Testing the entire lot using additional built-in test circuitry which allows the manufacturer to verify programmability and ac performance without programming the user array. If this is done, the resulting test patterns shall be verified on all devices during subgroups 9, 10, and 11, group A testing in accordance with the sampling plan specified in MIL-STD-883, method 5005.

(2) If such compliance cannot be tested on an unprogrammed device, a sample shall be selected to satisfy programmability requirements prior to performing subgroups 9, 10, and 11. Twelve devices shall be submitted to programming (see 3.2.4.1). If more than two devices fail to program, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 24 total devices with no more than 4 total device failures allowable.

Ten devices from the programmability sample shall be submitted to the requirements of group A, subgroups 9, 10, and 11. If more than two total devices fail, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 20 total devices with no more than 4 total device failures allowable.

d. Subgroups 7 and 8 shall consist of verifying the truth table.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.4 Programming procedures. The programming procedures shall be as specified by the device manufacturer. The test array function must be deleted prior to programming.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-07-14

Approved sources of supply for SMD 5962-86709 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-ECS. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-8670901XX	18324	82S105/BXA
5962-8670901YX	18324	82S105/BYA
5962-86709013X	18324	82S105/B3X
5962-8670902XX	01295	TIB82S105BMJ
5962-8670902YX	01295	TIB82S105BMW
5962-86709023X	01295	TIB82S105BMFK

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address	Fuseable link
01295	Texas Instruments, Incorporated 13500 North Central Expressway P.O. Box 655303 Dallas, TX 75265 Point of contact: I-20 at FM 1788 Midland, TX 79711-0448	Titanium-Tungsten
18324	Signetics, Incorporated 4130 South Market Court Sacramento, CA 95834	Ni-Chrome